Comp

--13. (New) A gasoline additive for a direct injection gasoline engine which

/comprises a nitrogen-containing compound represented by the formula:

$$R^{1} = \begin{bmatrix} R^{2} & R^{3} \\ O - C - C \\ R^{4} & R^{5} \end{bmatrix}_{a} O - CH_{2}CH_{2} - N - (X)_{2}$$

A

wherein R¹ is selected from the group consisting of hydrogen and a C₁ - C₃₀ hydrocarbon group, R², R³, R⁴ and R⁵ are each independently selected from the group consisting of hydrogen, a C₁ - C₁₆ hydrocarbon group and a group of the formula (2a) below, a is an integer from 1 to 200 and X is a group selected from Group B below, said formula (2a) being

wherein R^7 and R^8 are each independently selected from the group consisting of hydrogen, a C_1 - C_{10} hydrocarbon group and a C_2 - C_{10} alkoxyalkyl group, R^9 is a C_2 - C_6 alkylene group or a C_4 - C_{10} alkylene group having an alkoxyalkyl substituent, R^{10} is hydrogen or a C_1 - C_{30} hydrocarbon group, and f is an integer from 0 to 50; said Group B being constituted by

(B1) hydrogen,



- (B2) a C1 C30 hydrocarbon group,
- (B3) an alkanol group represented by the formula

$$-R^{14}$$
- OH (3a)

wherein R^{14} is a $C_1 - C_6$ alkylene group,

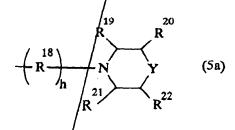
(B4) a nitrogen-containing group represented by the formula

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$$\frac{15}{R} \times \frac{1}{R^{16}} \times \frac{1}{g} \times \frac{17}{4a}$$

wherein R^{15} is a C_2 - C_6 alkylene group, R^{16} is selected from the group consisting of hydrogen, a C_1 - C_4 alkyl group, and a group of the formula (3a), R^{17} is selected from the group consisting of hydrogen, a C_1 - C_{30} hydrocarbon group and a group of the formula (3a), and g is an integer from 1 to 5, and

(B5) a group represented by the formula



wherein R^{18} is a $C_2 - C_6$ alkylene group, R^{19} , R^{20} , R^{21} , and R^{22} are each independently selected from the group consisting of hydrogen, a $C_1 - C_{10}$ hydrocarbon group and a hydroxyl group, Y is selected from the group consisting of a methylene group and a methylene group substituted by either a $C_1 - C_{10}$ hydrocarbon group, a hydroxyl group, an imino group, an imino

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group substituted by a C_1 - C_{10} hydrocarbon group or a hydroxy group, or oxygen, and h is equal to 0 or 1.

14. (New) The gasoline additive according to claim 13, wherein R^1 is hydrogen or a $C_1 - C_{12}$ straight or branched alkyl group.

15. (New) The gasoline additive according to claim 13, wherein R^2 , R^3 , R^4 , and R^5 are each independently selected from the group consisting of hydrogen, a C_1 - C_{12} straight or branched alkyl group and a group represented by formula (2a) wherein R^7 and R^8 are each independently hydrogen or a C_1 - C_3 alkyl group, R^{10} is a C_1 - C_{12} alkyl group, and f is equal to 0.

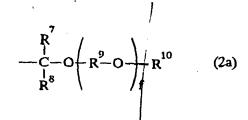
16. (New) The gasoline additive according to claim 13, wherein X is (B1) or (B3) and wherein (B3) is a group represented by formula (3a) in which R^{14} is a C_2 - C_3 alkylene group.

17. (New) A gasoline composition for use in a direct injection gasoline engine, which composition comprises a nitrogen-containing compound represented by the formula:

$$R^{1} = \begin{bmatrix} R^{2} & R^{3} \\ -C & C \\ -C & C \\ R^{4} & R^{5} \end{bmatrix}_{a} O - CH_{2}CH_{2} - N - (X)_{2}$$

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wherein R^1 is selected from the group consisting of hydrogen and a C_1 - C_{30} hydrocarbon group, R^2 , R^3 , R^4 and R^5 are each independently selected from the group consisting of hydrogen, a C_1 - C_{16} hydrocarbon group and a group of the formula (2a) below, a is an integer from 1 to 200 and X is a group selected from Group B below, said formula (2a) being



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wherein R^7 and R^8 are each independently selected from the group consisting of hydrogen, a C_1 - C_{10} hydrocarbon group and a C_2 - C_{10} alkoxyalkyl group, R^9 is a C_2 - C_6 alkylene group or a C_4 - C_{10} alkylene group having an alkoxyalkyl substituent, R^{10} is hydrogen or a C_1 - C_{30} hydrocarbon group, and f is an integer from 0 to 50; said Group B being constituted by

- (B1) hydrogen,
- (B2) a C₁ C₃₀ hydrocarbon group,
- (B3) an alkanol group represented by the formula

$$-R^{14}$$
- OH

wherein R^{14} is a $C_1 - C_6$ alkylene group,

(B4) a nitrogen-containing group represented by the formula

$$\frac{15}{R} = \frac{15}{N} = \frac{17}{R^{16}} = \frac{17}{g} \qquad (4a)$$

wherein R^{15} is a C_2 - C_6 alkylene group, R^{16} is selected from the group consisting of hydrogen, a C_1 - C_4 alkyl group, and a group of the formula (3a), R^{17} is selected from the group consisting of hydrogen, a C_1 - C_{30} hydrocarbon group and a group of the formula (3a), and g is an integer from 1 to 5, and

(B5) a group represented by the formula



wherein R^{18} is a C_2-C_6 alkylene group, R^{19} , R^{20} , R^{21} , and R^{22} are each independently selected from the group consisting of hydrogen, a C_1-C_{10} hydrocarbon group and a hydroxyl group, Y is selected from the group consisting of a methylene group and a methylene group substituted by either a C_1-C_{10} hydrocarbon group, a hydroxyl group, an imino group, an imino group substituted by a C_1-C_{10} hydrocarbon group or a hydroxyl group, or oxygen, and h is equal to 0 or 1.

18. (New) The gasoline composition according to claim 17, wherein the nitrogencontaining compound is contained in an amount of 0.001 to 10 mass percent, based on the total composition.

19. (New) The gasoline composition according to claim 17, wherein R^1 is hydrogen or a $C_1 - C_{12}$ straight or branched alker group.

20. (New) The gasoline composition according to claim 17, wherein R^2 , R^3 , R^4 , and R^5 are each independently selected from the group consisting of hydrogen, a C_1 - C_{12} straight or branched alkyl group and a group represented by formula (2a) wherein R^7 and R^8 are each independently hydrogen or a C_1 - C_3 alkyl group, R^{10} is a C_1 - C_{12} alkyl group, and f is equal to 0.